

What is claimed is:

[Claim 1] 1. A powertrain (1, 3, 9) for a motor vehicle, comprising an internal combustion engine (1) and an input shaft (7) to a stagegeared gearbox (9) connected to the engine crankshaft (2) by way of a multi-disc clutch (3), the gearbox having at least one direct gear and at least one indirect gear with intermeshing toothed gears (12, 15, 16, 17, 18, 19, 20, 21, 22, 23,), a control element (45, 48) having at least one engine control function, the control element registering input signals representing the gear selected and various engine and vehicle data, which as a minimum cover the engine speed or revolutions of the input shaft or the vehicle speed, and the control element (45, 48) being configured, in response to an input signal indicating that a direct gear is engaged, to be capable of controlling the engine (1) so that the engine can deliver a higher maximum permitted torque than when the direct gear is not engaged, the control element is further configured to allow the increase in the maximum permitted torque only if the efficiency of the gearbox (9) with direct gear engaged and increased maximum permitted engine output torque is superior to the efficiency of the gearbox (9) when any of the indirect gears (12, 15, 16, 17, 18, 19, 20, 21, 22, 23,) having a lower maximum permitted engine output torque are engaged.

[Claim 2] 2. A powertrain (1, 3, 9) for a motor vehicle, comprising an internal combustion engine (1) and an input shaft (7) to a stagegeared gearbox (9) connected to the engine crankshaft (2) by way of a multi-disc clutch (3), the gearbox having at least one direct gear and at least one indirect gear with intermeshing toothed gears (12, 15, 16, 17, 18, 19, 20, 21, 22, 23,), a control element (45, 48) having at least one engine control function, the control element registering input signals representing the gear selected and various engine and vehicle data, which as a minimum cover the engine

speed or revolutions of the input shaft or the vehicle speed, and the control element (45, 48) being configured, in response to an input signal indicating that a direct gear is engaged, to be capable of controlling the engine (1) so that the engine can deliver a higher maximum permitted torque than when the direct gear is not engaged, the control element is further configured to allow the increase in the maximum permitted torque only if the efficiency of the powertrain (1, 3, 9) with direct gear engaged and increased maximum permitted engine output torque is superior to the efficiency of the powertrain (1, 3, 9) when any of the indirect gears (12, 15, 16, 17, 18, 19, 20, 21, 22, 23,) having a lower maximum permitted engine output torque are engaged.

[Claim 3] 3. A powertrain (1, 3, 9) for a motor vehicle comprising:

an internal combustion engine (1) and an input shaft (7) to a stagegeared gearbox (9) connected to the engine crankshaft (2) by way of a multi-disc clutch (3), the gearbox having at least one direct gear and at least one indirect gear with intermeshing toothed gears (12, 15, 16, 17, 18, 19, 20, 21, 22, 23,);

a control element (45, 48) having at least one engine control function, the control element registering input signals representing a selected gear and engine and vehicle data, said engine and vehicle data comprising at least one of engine speed, revolutions of the input shaft and the vehicle speed, and the control element (45, 48) being configured, in response to an input signal indicating that a direct gear is engaged, to control the engine (1) to deliver a greater maximum permitted torque compared to the direct gear not being engaged; and

the control element being further configured to allow the increase in the maximum permitted torque only if the efficiency of the powertrain (1, 3, 9) with the direct gear engaged and increased maximum permitted engine output torque is superior to the efficiency of the powertrain (1, 3, 9) when any of the indirect gears (12, 15, 16, 17, 18, 19, 20, 21, 22, 23,) having a lower maximum permitted engine output torque are engaged.

[Claim 4] 4. The powertrain as recited in either of claims 1, 2 and 3, wherein the control element (45, 48) regulates the engine (1) so that the increased maximum torque is applied continuously so that the vehicle is not allowed to accelerate.

[Claim 5] 5. The powertrain as recited in either of claims 1, 2 and 3, wherein the control element (45, 48) regulates the engine (1) so that the increased maximum torque is applied in one step and continuously so that the vehicle is not allowed to accelerate.

[Claim 6] 6. The powertrain as recited in either of claims 1, 2 and 3, wherein the increase in the maximum torque only occurs on condition that the vehicle decelerates with the direct gear engaged and increased torque.

[Claim 7] 7. The powertrain as recited in either of claims 1, 2 and 3, wherein the increase in the maximum torque only occurs on condition that the mean speed of the vehicle does not increase, in comparison to what it would be if the maximum torque were not increased.

[Claim 8] 8. The powertrain as recited in either of claims 1, 2 and 3, wherein the higher maximum torque with the direct gear engaged is no more than 10 to 15 % higher than the lower maximum torque with an indirect gear engaged.

[Claim 9] 9. The powertrain as recited in either of claims 1, 2 and 3, wherein the control element (45, 48) comprises an engine control unit (48) and a transmission control unit (45) and the transmission

control unit is configured, based on input signals from a gear selector (46), to control the gearbox (9) and the multi-disc clutch (3).